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II. *Investigation of the specific Characters which distinguish the Rabbit from the Hare : In a Letter to Samuel Wegg, Esq; T. and Vice-President of the R. S. from the Honourable Daines Barrington, V. P. R. S.*

November 24, 1771

DEAR SIR,

Read Jan. 16. 1772. **I** CALLED lately at your house, to measure some parts of the quadruped which you have received by the last ship from Hudson's Bay, and am now convinced that it should be rather considered as a Hare than as a Rabbit, which latter name it hath obtained in that part of the world.

You will find indeed, from what I am going to state, that it is not very easy to settle a specific, and at the same time scientific difference, between these two animals, even when the greatest authorities in Natural History are consulted.

Ray [a] makes the distinction between the Hare and the Rabbit to consist in the smaller size of the latter, its property of burrowing, and the greater whiteness of the flesh when dressed; he chiefly relies, however, on the one being larger than the other;

[a] Syn. Quadr. Art. LEPUS.

as this is the most material circumstance in which they are supposed by him to vary, whether exterior or interior.

Though bulk is undoubtedly a very proper circumstance to be attended to in the description of an animal; yet recourse should never be had to it in establishing a specific difference, except it is the only criterion which can be fixed upon, and the disproportion in point of size is very great.

An Hare, however, does not exceed a Rabbit so much in bulk as a Patagonian does a Laplander, or a mastiff does a lap-dog, which yet are not to be considered as differing in species.

Besides this, age, climate, and food, as well as other circumstances, often occasion great distinction between animals of the same species, in point of bulk.

The Hare (for example) which is found in most parts of North America, is a third less than the European Hare, and consequently is scarcely larger than our Rabbit [b].

The next criterion which Ray fixes upon to distinguish the Rabbit from the Hare, is that the latter burrows in the ground; this, however, only holds with regard to the warren Rabbit, for those which are called hedge Rabbits seldom burrow, and many of them fit in forms as Hares do.

[b] Monsr. de Buffon is misinformed, when he asserts, on the contrary, that the American Hare is larger than that of Europe, (Hist. N. t. VI. p. 246) if I can depend upon the accounts I have received from those who have long resided in America, as well as some stuffed specimens which I have examined. See also Mr. Pennant's Syn. of Quadr. p. 249.

The

The third and last is, that the flesh of the Rabbit is more white when dressed; which distinction is always to be found between the European Hare and Rabbit, but it does not often happen that one can dress the flesh of an animal which comes from another part of the globe; it is therefore a criterion we can seldom have recourse to.

Linnæus, thus describes the Rabbit in his *Fauna Suecica*. (Art. *LEPUS*).

Lepus Caniculus, cauda abbreviata, *Auriculis Nudatis*.
Lepus cauda brevissima, *pupillis rubris*.

With regard to the first circumstance of the *Cauda abbreviata*, he equally applies it to the Hare in his *Systema Naturæ*, published in 1766, and drops the *Cauda brevissima* of the *Fauna Suecica*; where in propriety the Rabbit should not have found a place, as it is not indigenous in Sweden, the climate being too cold for it.

Linnæus therefore could only have described from a tame Rabbit, which I suppose had balder Ears by some accident than common, as his next criterion is *Auriculis Nudatis*.

I have examined lately a great number of Rabbits, and do not find that their ears are balder than those of a Hare: this second circumstance therefore establishes no specific difference.

From the third and last particular which this great Naturalist relies upon, I am also convinced that the specimen before him was not only a tame Rabbit, but that its fur was either white or caroty, because Rabbits of these colours only have red pupils [c].

[c] I have examined a great number of Rabbits thus coloured, which commonly have red pupils, though I have seen some
 I find

I find accordingly, that Linnæus hath omitted the *pupillis rubris*, as applied to the Rabbit, in the twelfth edition of his *Systema Naturæ*; but adds another distinction, which will be found equally to fail.

He there says, that the ears of a Rabbit are shorter than the head; whereas those of a Hare are longer: which is a just observation, when the warren Rabbit is examined; but the tame Rabbit (and particularly those which are white or caroty) have ears that are considerably longer than their head.

This circumstance, therefore, establishes no more a specific difference between the Rabbit and the Hare, than the greater length of the ears of a dog would, which in some varieties of that animal are known to be excessively long.

Mons. de Buffon, in his description of the Hare and Rabbit, agrees with Ray that there is nothing either exterior or interior which seems to constitute a specific difference, though he endeavours to establish an incontestable proof that they are really distinct.

He informs us, that he had tried to procure a breed between Rabbits and Hares, but never could succeed in the experiment.

This most ingenious and able writer does not state, however, at what ages the Hares or Rabbits were thus confined, which is known to be a most material

with black: the grey Rabbit however never hath eyes of a red colour. When the white Rabbits are very young, their eyes are often like a ferret's; but when they are grown to their full size, the pupils are generally quite red.

circumstance, by those who have raised male Canary birds [d].

Monf. de Buffon's expression is, "J'ai fait *élever* des hases avec des lapins," which at first seems to imply that he had reared them from their earliest infancy.

Upon consulting however the dictionary of Tre-voux, the compilers inform us the word *Elever* [e] often signifies the feeding and keeping an animal, without respect to its age; and they cite its being applied to elephants in Europe, which it is believed never bred in that quarter of the globe.

But the best expolitor of the sense in which an author uses a word is in other parts of the same work.

In the fifth Vol. of his Natural History, p. 210. Monf. de Buffon gives an account of his making the same sort of experiment between the Wolf and a Dog, in the following words:

"J'ai fait *élever* une louve prise dans les bois, de deux ou trois mois."

In this passage, the word is applied to a wolf, of three months old, and to shew that Monf. de Buffon did not think the age at which the animal is confined to be material in such an experiment, he immediately afterwards states, that he caught some

[d] Birds which differ specifically scarcely ever breed except both are taken early from the nest, and particularly the hen; I have procured a breed from two robins in a cage the present year by attending to this circumstance, and I believe I could equally succeed with almost any other kind of birds, as when they are thus reared, they have not the least awe of man.

[e] "*Elever* signifie, *Nourrir* aussi, soit plante, soit animal, & en avoir soin."

"On a de la peine à *élever* des *elephans* en Europe."

foxes

foxes in snares (which were probably therefore full grown), and kept them a considerable time with dogs of different sexes.

After this, he says [e], it is evident from these experiments, that wolves, foxes, and dogs are specifically different, without distinguishing between the foxes being full grown when caught, and the wolf which was only three months old.

But the decisive argument against *Monf. de Buffon's* experiment not being satisfactory, is to be found in *Mr. Pennant's Synopsis of quadrupeds*, p. 144: where he informs us, that a breed was actually procured between a dog and a wolf at *Mr. Brooks's* (animal merchant) in Holborn.

Monf. de Buffon also supposes that the Rabbit is much more sagacious than the Hare, because, both having equal powers of burrowing, the one thus secures himself from most enemies, whilst the other, by not taking the same precaution, continues liable to their attacks.

There are, however, several causes for the Rabbit's burrowing, and the Hare's neglecting to do so.

In the first place, the fore-legs of a Rabbit are shorter in proportion to its hind legs, and at the same time much stronger; the claws are also longer and sharper, resembling much those of a mole.

I have before observed that the Rabbits, which the sportsmen call Hedge Rabbits, seldom burrow; and they neglect taking this trouble, for the same reason that induces the Hare to trust to her form, be-

[e] *Hist. Nat. T. v. p. 213.*

cause they have an opportunity of selecting a proper place for their concealment.

The ground, however, in a warren, is eaten so very bare by Rabbits, that it is impossible for them to hide themselves if they make a form in any part of it, and they therefore very judiciously choose to burrow under ground.

Another reason, perhaps, for the Rabbit's burrowing arises from the animal's being not only born, but continuing the first six weeks of its life, under ground; they therefore only practise what they have seen and learned in their earliest infancy, as birds from the same circumstance always build their nest in the same form, and with the same materials.

I therefore cannot allow entirely of the distinction arising from the superior sagacity of the Rabbit, because it burrows; and *Monf. de Buffon* himself informs us, that tame Rabbits turned into a warren do not burrow for many generations [*f*].

Having thus endeavoured to shew that no proper criteria have hitherto been fixed upon to distinguish the Rabbit from the Hare, I shall now venture to suggest the two following, which, I flatter myself, will be found less liable to the same exceptions.

If the hind legs of an European Hare are measured from the uppermost joint to the toe, the number of inches will turn out to be just half of the length of the back, from the rump to the mouth (the tail not being included)

The hind legs of the Rabbit being measured in the same manner, and compared with the back are not much more than one third; from which

[II]

it seems not unfair to consider any animal of the Hare genus, (whose legs thus measured are less than the half of the distance from the rump to the mouth) as a Rabbit, and on the contrary when they are either one half, or more, as a Hare.

If the fore and hind legs of a Rabbit and Hare are also respectively compared, it will be found that the fore legs of the former are proportionally more short, than those of a Hare.

By both these criteria the quadruped from Hudson's Bay must rather be considered as a Hare, than a Rabbit (as it is called in that part of the world), according to the admeasurements subjoined, which include the respective proportions also of the Alpine Hare [b].

	Fore Leg. Inches.	Hind Leg. Inches.	Back and Head. Inches.
Rabbit	$4\frac{1}{2}$	$6\frac{3}{4}$	$16\frac{1}{2}$
Hare	$7\frac{3}{4}$	11	22
Hudson's Bay } Quadruped	$6\frac{3}{8}$	$10\frac{6}{8}$	18
Alpine Hare {	$6\frac{4}{8}$	$10\frac{6}{8}$	22
	From the uppermost joint to the toe.	From the uppermost joint to the toe.	

From the proportion of these parts, in the Hudson's Bay quadruped, according to this table, I flatter myself, that it may with greater propriety be classed as belonging to the Hare species, than by any other marks of a specific difference which have been hitherto relied upon.

[b] This species of Hare is found in the Highlands of Scotland, whence I received a specimen, which I had the honour of presenting to the Museum of the Royal Society.

I do not mean, however, to assert from this, that a Hare and Rabbit are certainly of a distinct species; as this can only be settled by failing to procure a mixed breed between the animals after repeated experiments, and under proper circumstances.

I shall now add, that the Hudson's Bay animal also approaches nearer to the Hare than the Rabbit, by the fore legs being much more slender in proportion to the hind legs than those of a Rabbit are; and that the claws are also shorter. As the animal likewise happened to die on the 22d of this month, I boiled the flesh, by your permission, which was as brown as that of the European Hare; and consequently it is to be classed as of that species, according to Ray's third criterion.

But the most curious particular in this quadruped is the white winter coat, which covered, at its death, the greatest part of the animal.

This refutes at once the notion, that animals in the more Northern countries become white by the intense cold of the climate, because this quadruped arrived in England about the time that the change should have begun if it had continued in Hudson's Bay.

As the animal was born, however, in a country where snow covers the ground during the whole winter, it is providential that the formation of its parts and juices should be such as should periodically occasion such a change in the fur; and perhaps, it is the only quadruped which ever was brought from a climate of such rigour, to a more temperate one, before the alteration of the colour in its hair took place.

By

By four different specimens in that valuable collection of animals, which the directors of the Hudson's Bay Company have lately procured from a country unvisited but by their own servants, it appears that the change begins in October (or perhaps the latter end of September) and that it is completed in January.

We owe this knowledge of the regular gradations of colour in this animal at different intervals as the winter advances, to the very sensible attention in the company's servants, who have tied memorandums to the specimen of each animal, which inform us of the day and month in which it was caught.

If the fur of your quadruped is accurately examined, it will be found to consist of two distinct coats of hair, one of which is much more thinly scattered over the body, but is more than twice the length of the inmost covering, at the same time that it is vastly stronger.

This upper and thinner coat is composed also of hairs which are white from the top to the root, and form the winter furtout for the animal : its brown fur, therefore, never becomes white, but is concealed by the upper coat.

This additional covering seems to be absolutely necessary for the animal's preservation, as it is thereby enabled to endure the rigour of a Hudson's Bay winter, whilst at the same time the colour of the new fur being white, prevents its being distinguished by its very numerous enemies [g].

If this furtout, however, was not to fall off during the summer, it would prove the destruction of the animal :

animal : because the extraordinary heat from such a warm cloathing would not only become highly inconvenient, but the colour also (being white) would point the animal out to its pursuers ; as Mr. Graham takes notice in his very accurate catalogue, that this quadruped does not burrow.

This very sensible officer of the Hudson's Bay Company likewise adds, that this animal continues always near the same spot ; that its coat is brown in summer ; that they breed from 5 to 7 young ones, and sometimes twice a year : he also states, that the weight at a medium is nearly 4 lb. I am,

DEAR SIR,

Your most faithful,

humble servant,

Daines Barrington.

[g] It must be admitted, however, that the white coat during the winter is not a sufficient protection to the animal against the sagacity of the arch-enemy man.

Mr. Reinhold Forster (who is a native of Polish Prussia) informs me that Hares are found in the northern parts of Europe, when the snow is on the ground, by an exhalation of vapours from their bodies, whilst they are sitting in their form, especially if the sun happens to shine.

I can very easily conceive that such a vapour may be distinguished, as I have frequently in a frosty morning seen the air condensed, which hath issued from the mouth of so small a bird as a Robin, when in full song.